S: Schwimmer E-4,5 (1966-1967) 1973
OJ23 Orokaiva OJ23
Mountain Orokaiva

CHAPTER II

THE SETTING

1. *Geography*

Although several good descriptions of the physical environment and general culture of the Orokaiva are available (e.g. Williams 1930, Waddell and Krinks 1968), a brief sketch of the setting of this study may be convenient. The Orokaiva live in the Northern District of Papua, a district bounded on the south-west by the Owen Stanley range, on the west by the Mandated Territory of New Guinea. Although the administrative centre of the district, Popondetta, lies only about 150 miles from Port Moresby, there is no road connection, so that the only communications with the outside world are by air and sea.

The Orokaiva live on the footslopes of Mount Lamington and on the plains to the north and east of these footslopes. This region is, by New Guinean standards, highly favoured by nature, as Brookfield recently emphasised (1966). In a classification of the natural resources of New Guinea according to the degree of limitations to land use', Brookfield describes a large territory surrounding Mount Lamington as 'suitable for cultivation with a mild degree of limitation'. This comprises 'some of the largest tracts of such good land in the whole country' (*ibid.* 47–8).

One distinguishing feature of the region is its lithological composition: there is an abundance of Pleistocene and recent volcanic deposits. The total area of such recent ash and lava deposits found in New Guinea is small, but notably fertile. Brookfield maps the annual rainfall of the region as between 100 and 150 inches. This is not so high that the land becomes permanently or semi-permanently waterlogged. On the other hand, the region mostly lacks well-marked dry seasons during which the soil would rapidly dry out. With regard to terrain, the region has extensive areas of low and moderate relief and good drainage. As for density of population, Brookfield paints a somewhat idyllic picture that needs correction: 'the greatest concentration of population, rising locally to 60 per sq. mile, lies on the best land in the area – the little-dissected footslopes of Mount Lamington, where smooth topography is combined with fertile soils and good drainage' (*ibid.* 64).

We find, in fact, that local densities of 200 and more per sq. mile are not at all rare (Rimoldi 1966: 4). In two villages I surveyed, I found population densities to be 180 (Sivepe) and 135 (Hohorita) per sq. mile. Rimoldi's analysis shows that the Sivepe population density is close to the upper limit the land can sustain with present technology and social organisation. The sample he chose (50 persons of the Jegase and Timumu clans) happened to have under-average land holdings, of 138 acres. Rimoldi shows that 110 of these acres are needed for

[TEXT CONTINUED ON PAGE 15]

5: Schwimmer E-4,5 (1966-1967) 1973
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subsistence shifting agriculture alone. This leaves hardly any margin for land unsuitable for cultivation, for bush land needed as a source of building materials etc., or for unequal distribution of land as between families.

We may divide the land occupied by Orokaiva into two broad sub-regions. The first is made up of the foothills themselves which have an 8 to 12 inch very dark brown top soil, rich in nitrogen and phosphorus. The fine-textured subsoils range from 10 to 22 inches in depth. This sub-region coincides approximately with the Saiho census division which had a population of 8,211 in 1966 giving a density of about 55 per sq. mile. The second sub-region, situated to the north and east of the first, consists of poorly drained but readily improvable plains. Here the population is very much sparser. Most village domains contain only a fraction of immediately utilisable good cultivation land and even this does not have the special fertility of the volcanic loam on the mountain slopes. The soils of Inoda, a village situated in this sub-region, have been discussed in much detail by Crocombe and Hogbin 1963, quoting the Commonwealth Scientific and Industrial Research Organisation (C.S.I.R.O. [1954]). This sub-region forms part of the Sohe-Popondetta census division which, as a whole, has a population density of about 20 per sq. mile. Villages are smaller and more dispersed.

The boundaries of what we may call the Orokaiva tribal area are probably best determined by the criteria used by the Papuans themselves, namely linguistic criteria. Orokaiva is part of the Binandere group of eight languages (see Wurm 1960) spoken in most of the more densely populated parts of the Northern District; of these languages, Orokaiva is spoken by the greatest number, but only about half the population in the Ovokaiva-Binandere area. The only language of this group for which a reasonably full description (grammar and dictionary) has been published is Binandere (Copland King 1927), a language spoken around the lower part of the Mambare and Gira rivers. Other languages of this group are: Orokaiva, Notu, Aiga, Huniara, Yema, Taindaware. While there are considerable vocabularly differences between these languages, there is a close resemblance in grammar and enough resemblance in vocabularly to make a very limited degree of intercommunication possible. (Chinnery and Beaver 1916 and an unpublished manuscript by Capell [n.d.]). We do not know much more about the Binandere group of languages except that it is a Papuan grouping (Grace 1968).

It seems to me that dialect divisions within the Orokaiva language area which have been noted at various times (Beaver 1916, Williams 1930) are rather minor. A fairly accurate idea of the boundaries of the Orokaiva language area may be obtained by identifying this area with the district administered by the Higaturu Local Government Council which covers the Saiho and most of the Sohe-Popondetta census divisions.

Williams (1930: 157–9) attempts to distinguish the Orokaiva language speakers from other tribal groupings by listing cultural differences (notably in dress and ornaments) but these are not pronounced and, under modern conditions, may be observed only on ceremonial occasions when headgear and bark-cloth are worn.

Prior to European contact, the normal mode of settlement was in hamlets containing 6 to 12 houses and surrounded by land used for shifting agriculture.

[TEXT CONTINUED ON PAGE 18]

S: Schwimmer E-4,5 (1966-1967) 1973
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Mountain Orokaiva

TABLE II/3

FOOD PLANTS PER HOUSEHOLD: INONDA AND SIVEPE COMPARED

(*Sources*: Crocombe and Hogbin, 1963: 8; Rimoldi, 1966: 17)

Crop	*Inonda*		*Sivepe*	
	Average	*Range*	*Average*	*Range*
Taro (*colocasia* sp.)	1.3 acs.	2.6–0.4 acs.	0.97 acs.	0.39–2.30 acs.
Sweet Potato	0.2 acs.	0.4–0 acs.	0.07 acs.	0–0.20 acs.
Corn	72 plants	140–0 plants	223 plants	0–442 plants
Bananas	81 trees	145–12 trees	71 trees	35–126 trees
Pitpit (*ina*)	56 clumps	181–4 clumps	88 clumps	0–400 clumps
Sugar	71 clumps	167–34 clumps	34 stools	11–54 stools
Yams	24 vines	61–0 vines	65 vines	0–136 vines
Manioc	10 plants	27–4 plants	a few	
Taro (*xantosoma* sp.)	5 plants	25–0 plants	28 plants	0–91 plants
Native Cabbage	–	–	22 plants	0–100 plants
Pawpaw	–	–	17 trees	5–32 trees
Beans	a few		17 plants	0–110 plants
Cucurbits	2 vines	10–0 vines	13 vines	9–28 vines
Shallots	a few		a few	
Ginger	–	–	a few	
Tobacco	–	–	18 plants	0–59 plants
Pineapples	1 plant	7–0 plants	no data	
Tomatoes	a few	–	no data	

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Hohorita. My stay in Hohorita lasted for a month, and I made several return visits. This village lies thirteen miles from Popondetta on the road to Saiho, has forty-one dwelling houses and a population of 358. Hohorita and three contiguous hamlets are the home of the Sangara who survived the Mount Lamington disaster. The Sangara population was reduced by the eruption from some 3,000 to 195 people, who stayed together in the evacuation camp and later founded Hohorita, where the remnants of about a dozen clans may be found. By far the strongest clans in this village are those whose homes, at the time of the eruption, were at the outer edge of the devastation area and who were able to run away from the *nuée ardente* before the searing blast could reach them.

Hohorita, though built much earlier than Inonda (1957), was not beautified with the same care. The area between the two rows of houses was bare, except for some coconut and betelnut palms. The village was divided into two rectangles by a short row of houses. The front and back part were settled at different times and different clans were dominant. When I was working in the front half I would meet hardly anyone from the back half and vice versa. A feast house had been built in both the front and the back sections of the village. The feasts had been held just a few weeks before my arrival, to entertain neighbouring villages. Originally a combined feast had been planned, but disagreement had prevented it. There was no chapel in the village, but a mission station just next to it, with a white mission teacher, a mission school and several Papuan teachers who were in charge of church services. This was a contrast with Inonda, which was several miles removed from a school and even further from a mission. There was a woman's club with a small club house, but again this was supported by only a small minority.

Hohorita was entirely Christianised, in the sense that everyone had been baptised. A number of the older men had been educated in a mission station prior to the eruption and had become mission teachers while evacuated. When coffee became a lucrative cash crop – more lucrative than teaching – many of them had retired to the village. As a result the leadership pattern differed sharply from Inonda. About twenty men in Hohorita had held down occupations requiring some European skills, and these men tended to work out together the everyday and long-range decisions required in the village. The leading personality was, at that time, a well-educated man, who for years had been the chairman of the Higaturu Local Government Council. In Hohorita virtually everyone was growing coffee. Some men worked in the plantations nearby.

Ecologically, Inonda is characteristic of the alluvial plains region to the east Lamington foothills. Before the eruption, the concentration of population was entirely on the higher reaches of the tribal domain as rainfall and fertility are higher there. The lower portion of the territory, away from the mountain, was used for hunting. But the government discouraged reoccupation of the higher land, for fear of further eruptions. Hohorita is lower down than the old villages. The more elevated land is used a little less than before, and often for coffee rather than subsistence crops. The topsoil is volcanic loam; the rainfall is probably between 120 and 150 inches per annum. Population density is 135 per sq. mile. This is a little less than is usual on the Mount Lamington foothills, but prior to the eruption the population must have been very dense indeed.

Sivepe. I stayed in Sivepe for about nine months, from September 1966

241 About 2 acres of land held by the sample were being used for food gardens by members of other clans. If we assume that the parties periodically exercising reciprocal usufructuary rights to each others' land eventually use comparable areas, the number of acres of a patrilineal group's land cultivated over several years will be roughly equivalent to the total area which it has itself cultivated.

(126) Chain and compass surveys were made of all current gardens cultivated by the sample. These gardens ranged from plots overgrown with weeds, but still yielding taro or sweet potato, to newly cleared areas. Measurements of the areas which were cleared during the last 2 weeks of our survey were made hurriedly and are less accurate than the other figures. The time spent clearing new areas in each of these 2 weeks was more than the total time spent on gardening recorded in any previous week and the figures below at least give a fair indication of the significant size of new clearings in relation to other categories of the area under cultivation shown in Table 2. The lack of rain at the time made it impossible to plant any of the new areas immediately.

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Table 2

Current garden areas
(acres)

	Area per head of population	Area per able-bodied person (over 16)	Area per household	Total
Garden currently producing	0.14	0.27	0.57	6.86
Garden planted not yet producing	0.12	0.23	0.48	5.81
Garden cleared not yet planted	0.10	0.20	0.43	5.17
Total area under cultivation	0.36	0.70	1.48	17.84

The 0.36 acres of current garden per head of population compares with the figure of 0.31 at Inonda (Crocombe and Hogbin 1963:10).

The proportion of currently-producing gardens seems to have been unusually small at the time of our survey. Sixty-one per cent of the garden area had been brought under cultivation in the past 5 months (2.2 acres per month), whereas the rest was all that was still producing after cultivation during the year before that. Some households had planted, harvested and abandoned some plots in the meantime. Most of the gardens which were being harvested

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during our stay had been planted within the previous 6 months and those which had been planted longer were generally well over a year old and were entering the closing phases of production.

One householder whose older garden had been destroyed by pigs had first cleared his present gardens only 5 months before our survey. Some of the older current gardens measured were almost exhausted and would only just last until the taro in the householders' new gardens matured. The supply of food from the old gardens in these cases was supplemented mainly by the newly-sown corn which matures in about 3 months, by tree crops, yams and Xanthosoma taro from small scattered stands.

In deciding on the time to establish new gardens for their future subsistence needs the villagers seem to have taken into consideration the prevailing seasonal conditions and the prospects of heavier rains a few months before our survey so that we noted only a few gardens that were made in the year before our arrival and already producing.

By determining the area which has been cultivated by each household since it made the first clearings for its current gardens a monthly rate at which it established gardens was calculated. The total area gardened monthly by the 12 households together was found to be 1.53 acres. The sample therefore cultivates 18.36 acres per year or 0.36 acres per capita.[1]

For the above reasons we believe that we would have obtained more reliable figures had we been able to extend the length of the survey to cover fluctuations in the rate of cultivation and in the ratio of new to old gardens. The figure of 0.36 acres as the yearly per capita requirement for garden land may be unusually high: however, the Survey of Indigenous Agriculture at Sivepe estimated that between April 1961 and March 1962, 53.76 acres had been brought under cultivation by the 139 people in the village, or 0.34 acres per capita. The mission from the International Bank gives the average per capita requirement as about 0.3 acres under this class of land use in Papua and New Guinea.[2]

If an average 6 year fallow cycle is followed, the present population of the sample cultivating land at the rate of 18.36 acres per year require 110 acres to maintain their present

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[1] The 4 households who had no current gardens older than 10 months had made these new gardens at the annual per capita rate of 0.51 acres compared with 0.29 for the rest of the sample who were still using earlier gardens.

[2] Mission from the International Bank 1964:74.

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311 standards of subsistence agriculture.[1] Their own property totals 138 acres.

c. Hunting and fishing

224 [136] These pursuits add variety ot the diet but provide comparatively little food. Most of the game surviving in the area is small and there are no large fish to be found in the mountain streams. Small marsupials such as the cuscus, bandicoot and, more rarely, the land wallaby, together with flying foxes and birds are the main sources of animal protein. Nets and hunting spears are generally used to catch these animals after they have been flushed out by the hunter's dog. Traps are seldom set for game but we were told this formerly was a more common technique. Snares for the smaller types of animal are often made by boys and one or two of the men. Two members of the sample owned licensed shotguns and these were very effectively and economically used. One of these men would place his services at the disposal of anyone who supplied cartridges for the gun; the other allowed a limited circle of people to use his gun. The guns were frequently used for hunting at night in the dry weather during our survey.

226 Neither of the two forms of concerted hunting common among other Orokaiva (the drive towards a pig net and grassburning, Williams 1930:45) is practised to any extent as there are few wild pigs and little grassland in the area.

Spears and fine-mesh nets are used in local streams to catch eels and the 7 types of small fish found. This task is shared by men and women usually when the water is low during a period of dry weather. They may search for fish with a net along the Sohu River wherever it passes through land held by a member of the village, but the small rock dams built by a man to form pools suitable for the use of the spear are made only where the river passes through his own land.

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[1] This requirement is 2.2 acres per capita. Barrau (1958:75) says that 2.5 to 5 acres per capita are sufficient for this type of agriculture in Melanesia, assuming the average area of garden is 0.25 acres and that the duration of bush fallow ranges from 10 to 20 years. In March 1951, 40 square miles of unrestricted land were considered suitable for resettling 4,500 of the survivors of the recent eruption (Plant 1951:4; Belshaw 1951:9). It was felt that these 5 acres per capita were enough only to meet the immediate requirements of traditional subsistence gardening for the next few years. (It was well-wooded and appeared 'most productive' and easily accessible by road.) Considerable population increases were anticipated.

7: Rimoldi et al. E,I-S (1962-1963) 1966 GJ23 Orokaiva GJ23
Mountain Orokaiva
Sivepe

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249 657 stood untouched for about 20 years. In 1944 Humphries (1944:4) reported that 'the trees grew to maturity with very litte attention from the natives and today they are being tapped for the first time'.

[434] In 1941 an agreement under the Transactions with Natives Ordinance (1893-1935) was made between a European planter recently arrived in the area and the villages with rubber stands, whereby he obtained exclusive rights to tap, collect and dispose of the produce of all the trees, while from 6 per cent to 12 per cent (according to ruling market prices) of the gross sum obtained by the lessee was to be paid to the owners every 6 months; in general this meant that the owners received 1 penny to 3 pence per pound. The contract was to extend for 5 years and the lessee was to have the option of renewing it for a further period of 5 years.

The arrangement became effective in 1941 but was interrupted by the Japanese invasion of the Northern District. In 1943 A.N.G.A.U.[1] authorized the lessee to return to restart production from the trees. Mann (1954:35) says that

> [433] during 1944, under the supervision of the rubber division of the Production Control Board, tapping of some 250 acres of those smallholdings was organized. During 1945 production was over one hundred thousand pounds dry rubber, indicating average yields of about four hundred pounds per acre.

249 433 311 Various estimates have been made over the last 20 years as to the size and number of the rubber stands in the area. Mann's figure of 250 acres contrasts with the lessee's estimate of 110 acres,[2] and with Humphries' assessment of about 80 acres. There were 95 stands with a total of 7,721 trees listed in the 1941 agreement but during 1943-5 a further 42 stands were added so that most of the available stands were then included in the scheme.[3] In 1951 Belshaw claimed that there were roughly 6,000 rubber trees in the 'Periho' tribal area within what was formerly the Kokoda District and another estimate about the same time put the number of trees in this wider area at 10,000. The annual report of 1959 stated that 26,000 trees 'in the Awala area' were tappable. A

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[1] The Australian New Guinea Administrative Unit.

[2] Assuming this estimate and the figure of over 100,000 pounds for 1945 production to be accurate, we must conclude that the average yields were more than twice those given by Mann.

[3] It was reported by patrol staff that 'nearly all' the rubber stands were being worked from Awala in August-September 1943.

249 433 311 recent agricultural census listed 55 stands with 13,700 trees in the Saiho Census Division (which coincides roughly with the 'Periho' area) and another 3,700 trees in the Sangara Census Division. However, according to the 1964 census there were 14 Saiho villages with stands, carrying 10,000 rubber trees altogether, 4,500 of them less than 6 years old and another 3,500 less than 10 years old.[1] There were also 46 individually-held plots recorded with 8,000 trees, all less than 10 years old. The total number of rubber trees on village-stands in the Saiho, Sangara, and Togahau Census Division was put at almost 26,000.

249 657 [434] The agreement between the lessee and the villagers was modified in 2 ways after the war. When the scheme was resumed in 1943 the Administration decided that in order to facilitate the handling of money, the royalty to be paid to the owners should be changed from a percentage basis to a flat rate of a shilling twice a year per tree tapped;[2] and the royalties set aside every 12 months by the lessee were sometimes withheld by the District Office so that the people did not receive payment for more than 18 months, although the contract provided for half-yearly payments.

249 [464] Until 1946 local villagers were employed by the lessee to tap their stands. A tapper would work in his own area but his task necessarily included some stands belonging to nearby villages other than his own. This caused some misunderstanding at first but the owner's suspicions were eventually allayed.

[625] [623] The Village Constables had been responsible for seeing that the magistrate's instructions were obeyed when the plantations were established but apparently the Village Councillor in some cases assumed control over the distribution of the income among the 'owners', who were listed in 1 schedule of the agreement, although the money was shared under the supervision of a government official. One man recalled that 1 delayed payment of £114 was made for rubber from a number of stands owned by members of his village; he claims that the money was shared by more men than those named in the agreement drawn up several years before.

The lessee believes that the stage at which contract arrangements were conducted to the best effect and greatest satisfaction of the villagers was the period 1943-6 when he arranged to employ some of them as paid tappers.[3]

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1 These would include self-sown trees.

2 There is no evidence to support Belshaw's assertion (1951:13) that the owners were at one time receiving a royalty of only 6 pence per tree.

3 In September 1943 government officers reported that there was a good daily yield as the trees were in good condition.

8: Waddell & Krinks E-4,5 (1964-1965) 1968 QJ23 Orokaiva QJ23

Chapter 1

The physical and social setting

This chapter summarises the physical and social background to current attitudes to cash cropping among the Orokaiva. 128

The physical environment

(a) Landforms (see Map 1)

Lying between the main New Guinea cordillera and the Pacific Ocean, the Popondetta sub-district[1] has a great variety of landforms and soils and, to a lesser extent, of vegetation.[2] Bounded on the south-west by the foothills of the Owen Stanley Range (4,000 ft) and on the south by Mt Lamington[3] and the Hydrographers Range (4,000 to 5,000 ft), the area comprises a broad plain sloping gently north-eastwards to the Pacific Ocean. Three elements may be distinguished within it: strongly dissected piedmont terraces, alluvial plains of volcanic materials (to the north-east of Mt Lamington) and flood plains from 10 to 25 miles wide extending from the terraces to the coast. All characteristically support primary or regrowth lowland forest except in the relatively drier and sandy areas, particularly on the plains north-east of Mt Lamington, where there are extensive stretches of grassland. 131 133 133 [137]

The CSIRO (Division of Land Research) considers (1964:17) that although there is more poor than good land in this area, 'some of the best land in the Territory' occurs on the gentle northern foot slopes of Mt Lamington and in parts of the flood plains where fertile volcanic soils and stratified sediments with a high organic content have developed. The major factors limiting land use are steepness of slopes in the mountain zone, and poor drainage and flooding in the lowlands. Soil deficiencies do not appear to be a serious limiting factor. 311 133

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[1] An area of 3,712 square miles.

[2] The following description is derived from CSIRO 1964:10-15.

[3] A volcano which last erupted in 1951, resulting in extensive destruction and loss of life.

8: Waddell & Krinks. E-4,5 (1964-1965) 1968 QJ23 Orokaiva QJ23

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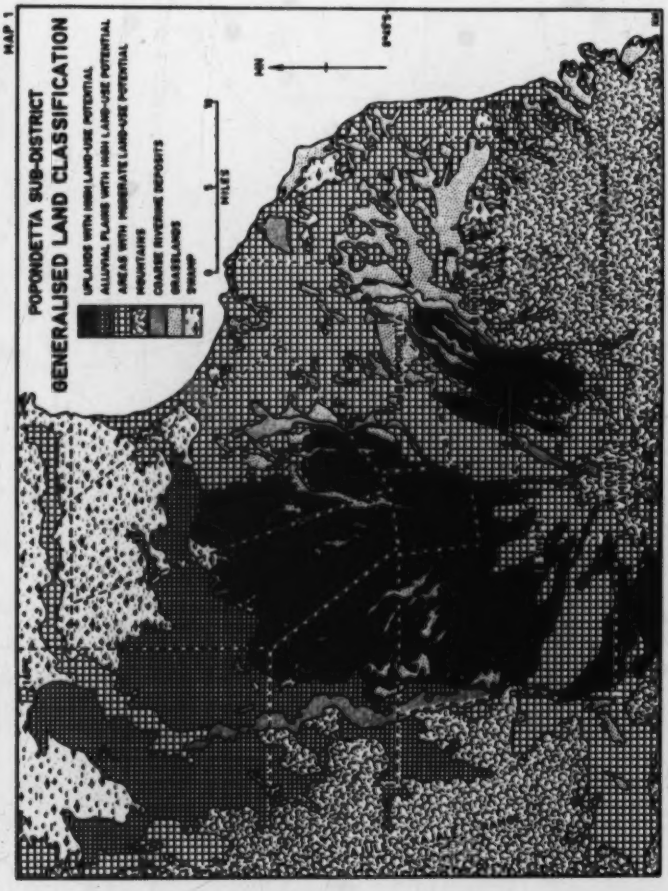

may be influenced by proximity to a new area of land it is intended to bring into cultivation.[1]

(iv) Rights to land. The Orokaiva social system is characterised by flexibility in arrangements for group membership and for transmission of rights to land (e.g. through adoption). Inheritance is usually patrilineal[2] and various land rights may be distributed at a number of levels of social segmentation - the clan branch, lineage and individual - the relative significance of each varying with locality and, apparently, population density.[3] Further, more than one descent group may have rights in a single piece of land. In many instances the clan branch functions essentially as a reference group, all land being associated with it. However, it may function as a primary right-holding group for those hunting areas distinct from current garden land, typically the grasslands.[4] Priority rights to garden land are normally vested in the lineage; nevertheless, all such land is ultimately identifiable with individuals who may distribute land (and property) prior to their death not only to their immediate family but also to more distant kin.[5]

This markedly influences the pattern of both exploitation of land and transmission of rights. In the low density areas a number of descent groups often agree to exploit simultaneously an area

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[1] Rimoldi (1966:68) found no evidence of the need for new land as a motive for movement. He considers the major motives to be fear of sorcery, disputes between kin and life-crises. It is nevertheless conceivable that the fear or sorcery or disputes might arise from poor yields from over-cropped garden land, which would require a move in any case.

[2] Women are known to hold land only as a form of trust for their children (Crocombe and Hogbin 1963:75).

[3] We do not know whether any causal relationship exists between these two factors. However, the existence in low density areas of primary forest surplus to current garden needs, plus extensive grassland and mountain areas utilised largely in hunting only, might well account for the responsibility for such land being vested in the larger social group, the clan branch. This group's significance has been eroded in the high density areas, where there is little or no land surplus to present gardening needs.

[4] In the high density areas hunting is frequently confined to garden land and individuals can commonly hunt over land belonging to anyone in the village.

[5] For example, sisters' sons (Crocombe and Hogbin 1963:24).

241 423 [613] that is then cultivated contiguously,[1] while in the high density areas there is a tendency towards a more individual pattern of exploitation.[2] Short-term rights to land for the non-lineage members are frequently granted (on a reciprocal basis), sometimes to facilitate contiguous cultivation or to compensate for inadequate landholdings. This pattern is promoted by the high degree of [425] fragmentation of individual holdings. Further to this, Rimoldi (1966:62, 95) observes that plots are often permanently transferred outside the direct patrilineal line, and this applies equally to [578] land under both cash and subsistence crops. In the Inonda area, however, Crocombe and Hogbin (1963:73-5) observe that there is considerable reluctance to plant, or make land available for planting cash crops if the land has not been acquired patrilineally, for fear of subsequent disputes. Thus the tenurial situation may be of considerable significance in the development of cash cropping.

245 428 Traditional tree crops are not planted in stands or groups like cash crop trees, but are widely scattered and may equally well be planted on patrimonial land or on land of affines or matrilateral kin. Inheritance of rights to trees usually does not involve rights to the land on which they stand. However, owing to their wide spacing, their presence rarely seriously affects other cultivation of the land.

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[1] The decision-making process has not been investigated but it appears that there is no institutionalised position relating to land matters. An exception is provided by the Yega of the Gona census division who recognise a 'land custodian' (see Daksyns 1965:55).

[2] It is possible that this is an expression of the fact that sufficiently large areas of suitable secondary forest are not available at any one time to permit contiguous cultivation. Two other factors are that in low density areas wild pigs and other animals necessitate the fencing of gardens, a task which is easier for contiguous groups than for individuals, and that in forest much wider fringe clearing is necessary than in low second growth. The volume of fringe clearing per garden is much reduced if gardens are contiguous.

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Chapter 4

The two communities: Sivepe and Inonda

184 The villages of Sivepe and Inonda represent the extremes of population density, and therefore land availability, in the sub-district. There are significant differences between them in resources and in the degree and character of their participation in the monetary economy and their interactions with the principal external agencies.

Sivepe

133 Sivepe is situated 1,300 feet above sea level on the lower north-
[134] western slopes of Mt Lamington. Its land is classified by the CSIRO survey (1964:32) as belonging to the Awala Land System and is
137 characterised by fertile loam topsoils and a close-textured drainage system. The vegetation comprises predominantly secondary forest
● 311 and various stages of regrowth, with little grassland. The land-use potential is regarded as high and the fertile, well-drained soils are best suited for perennial (tree) crops.

301 The village is located in the most densely settled part of the sub-district, the Saiho census division, and there are eighteen villages within a radius of three miles (see Map 3). It has been
[131] on its present site for about ten years, but preparation of a new site, less than one mile away, was commenced late in 1964. Sivepe is twenty-eight miles from Popondetta by road, the last three miles being a little-used jeep track linking Awala with the villages on the lower slopes of Mt Lamington. Consequently, coffee and rubber have to be carried to Awala (or nearby Saiho) to be sold and purchases are normally made in the trade stores there. At Awala are a European rubber plantation, a rubber factory which purchases village latex and a well-stocked trade store. At Saiho are two trade stores, the principal Administration hospital for the Northern District (where medical orderlies and infant welfare nurses are trained) and a primary 'I' school. In mid-1964 a daily bus service was established between Saiho and Popondetta.

491 Also in mid-1964, several villages voluntarily commenced the
[499] construction of a new all-weather road, linking Sasembata mission

[TEXT CONTINUED ON PAGE 37]

Only one man owns a mosquito net and there is only one transistor radio in the village. Some of the older people still wear tapa cloths but new ones are seldom made now. The more common form of dress is a pair of shorts, a skirt or a laplap, the skirts being mostly sewn at mothers' union sewing classes run by the Anglican mission at Sasembata.

Two men in the sample own shotguns, costing $58.75 and $59.75. These are the only items in the village representing large capital outlays and several other men had made contributions of $2 and $6 towards their purchase, so they can borrow them in return.

None of the houses conforms to the traditional Orokaiva style, but all are built wholly of local materials. They contain no raised platforms for sleeping, no shelves for food storage, and no cooking facilities other than an open fire. One man has built a 'kitchen extension' to his house while several other households cook primarily in shelters outside. Also, one man has built a simple table and bench outside and some members of the household occasionally eat at this.

A creek running beside the village provides the water for bathing, cooking, laundering, washing dishes and pulping coffee. Paths are narrow and unimproved despite constant use so that they become difficult to negotiate in wet weather. Not all households have pit latrines and those that do only use them irregularly. Small children often defecate on the village surrounds and standing water in various parts is a further health hazard.

Inonda

Inonda lands run from the low plains (200 feet above sea level), beside the Sambogo and Girua rivers, into the foothills of the Hydrographers Range. They include a variety of landforms, soils and vegetation - one-third of the village lands are covered with soils of the Popondetta family, which are well-drained sandy loam volcanic soils, supporting grasslands of Saccharum spontaneum-Imperata cylindrica alliance; one-fifth consists of coarse-textured riverine deposits which are moist, apparently fertile and support forest and regrowth. These are preferred for food gardens, although gardens are also made on the lower valley slopes of the Hydrographers, where the soils consist of well-drained clay loams covered with dense forest or secondary growth. The soils of the foothills are shallow and stony, supporting lower montane rainforest and, as with the grasslands, this area is used only for hunting and foraging. The CSIRO survey classifies most of the Inonda lands as having moderate land-use potential.

Chapter 8

The two villages compared

433 184 (a) Levels of activity in relation to available resources

In expending an average of 43.5 hours per man-week the Inonda villagers are slightly more active than their Sivepe counterparts, but the difference relates to the subsistence sector. Although both are communities of cultivators with taro the staple crop, the supplementary food producing activities are substantially more significant in Inonda, with fishing particularly important during the wet season. This more diversified economy partly explains the higher level of subsistence activity at Inonda (see Table 8:1).

More time is required to achieve subsistence at Inonda, principally because of the journey to work: 25 per cent of all activity time is devoted to travelling, even at the new site, compared with only 15 per cent at Sivepe.[1] Thus, if time spent in travelling is deducted, the difference between the two villages is eliminated, Inonda spending 25.1 hours per man-week on subsistence and Sivepe 25.5 hours.

Environmental differences provide some explanation for Inonda's subsistence economy being more diversified and the location of activities more dispersed. Not only are the soils around Sivepe of a uniformly high agricultural value but all the land is forested and therefore potentially available for cultivation. By contrast, [311] the soils at Inonda are of variable quality and at least one-third of the total area is grassland and therefore unavailable for cultivation according to present practices, while even some of the forested areas are unsuitable due to the infertility of their soils. [241] Most Inonda gardens are made on a land system covering only one-fifth of the total area. Probably on account of this generally lower soil fertility, the fallow period at Inonda is about ten years compared with only six at Sivepe and, using Crocombe and Hogbin's and Rimoldi's estimates of the garden requirements per head of

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[1] The contrast is even more marked if the uncorrected percentages are used - 32 per cent and 18.3 per cent respectively.

A, [See Category 461, p.171--Analyst]

Chapter 13

Rural productivity and capital formation

It has been demonstrated that, among the men at least, there is a significant amount of unutilised labour time available and that, although the Orokaiva are evidently committed to the cash economy, individual involvement is marginal. In particular, the commercial production of agricultural crops is poorly developed. Since this is the one form of enterprise which would appear the least disruptive of the subsistence routine and which exploits the available resources of land, labour and customary skills some explanation is required.

Although no direct evidence is available, Orokaiva diet, like that of many New Guinea societies, is probably adequate in calories but deficient in protein content. The ability of adults to undergo sustained periods of hard work, either in employment or in such subsistence tasks as sago-making, suggests that diet does not impose serious limitations on their productive capacity. It is worth noting, however, that there is a marked falling off in the level of activity in Sivepo during the dry season at a time when the diet, heavily reliant on sago, is least satisfactory. Moreover, this coincides with the coffee flush.

Both villages have access to more agricultural land than is required for subsistence. Crocombe and Hogbin (1963:10) estimate that, at Inonda, there are 580 acres of 'good gardening land available', of which only 127 acres are presently required. Rimoldi (1966:20-1) estimates the Sivepo sample's requirements to be 110 acres out of an available area of 138 acres, all of which is considered suitable for cultivation. In the former village only about 5 acres are under commercial crops (coffee, coconuts and cocoa) and 4.6 acres in the latter (coffee and rubber). Accessibility may be important in the failure to plant additional areas under cash crops. The preference for establishing such plantings close to the village at Sivepo, where the initial processing is carried out, has already been noted.[1] In the case of Inonda the degree of commercialisation is influenced

[1] See pp.110-11. A
A,[See Category 361, pp. 110-111--Analyst]

311 by the dispersal of suitable agricultural land over a wide area, creating a large 'journey to work' component in all productive tasks. After moving the village to its new site, an area about twenty minutes' walk away was selected for extensive new coffee gardens (partly on the grounds of proximity to an ample supply of water), but it was eventually rejected and seedlings were planted instead in harvested food gardens only five minutes away from the village.

433 For the indigenous producer transport is a major consideration. Clark and Haswell (1964:157) state that

> The methods of transport available to subsistence agricultural populations...are so costly that produce only has to be carried a limited distance before most of its value, from the point of view of net returns from the sale, has gone.

Porterage is arduous work requiring a good diet, and the minimum cost measured in terms of kg. grain equivalent/ton km., is high compared with other modes of transport.[1] The lower the value of a good per unit weight the more critical this factor becomes. In the case of coffee and copra, where initial processing results in a weight loss in excess of 80 per cent,[2] considerations of distance from the planting to the village (where the processing is carried out) are [36] particularly important. The Sivepe people market their parchment coffee at a point about one hour's walk from the village but they consider the distance excessive and hope to eliminate it by relocating the village on a road accessible to buyers' vehicles. If a journey of one hour's duration is considered the maximum they will carry their parchment coffee, it is reasonable to suggest that one-fifth of this time, or twelve minutes, is the maximum they are prepared to walk from village to garden to harvest the crop. Certainly it is evident that, given the means of transport available, the marginal utility of cash cropping decreases rapidly from village to garden and to point of marketing, with the rate of decrease considerably higher in the former direction.[3]

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[1] See Clark and Haswell 1964:160-3.

[2] Among the Chimbu of the New Guinea highlands it is estimated that 5.48 lbs of arabica cherry produces 1 lb of parchment (Brookfield: personal communication) - a weight loss of 81.8 per cent. It is assumed that the kernel comprises one-third of the total weight of a coconut and, of this, 50 per cent is water. In good quality copra the moisture content is reduced to 6 per cent - i.e. a weight loss of 81.6 per cent is effected in the production of copra (Department of Commerce and Agriculture 1953:1).

[3] While the ratio may remain constant the actual time involved will, of course, vary greatly from point to point, according to such considerations as the utility of money, expectations from cash cropping, etc. Thus the Aiga must walk for 3 hours or more to sell their cocoa (Rimoldi: personal communication).

10: Dakeyne K-5 (1962-1964) 1966 OJ23 Orokaiva OJ23
Yega
Ononda

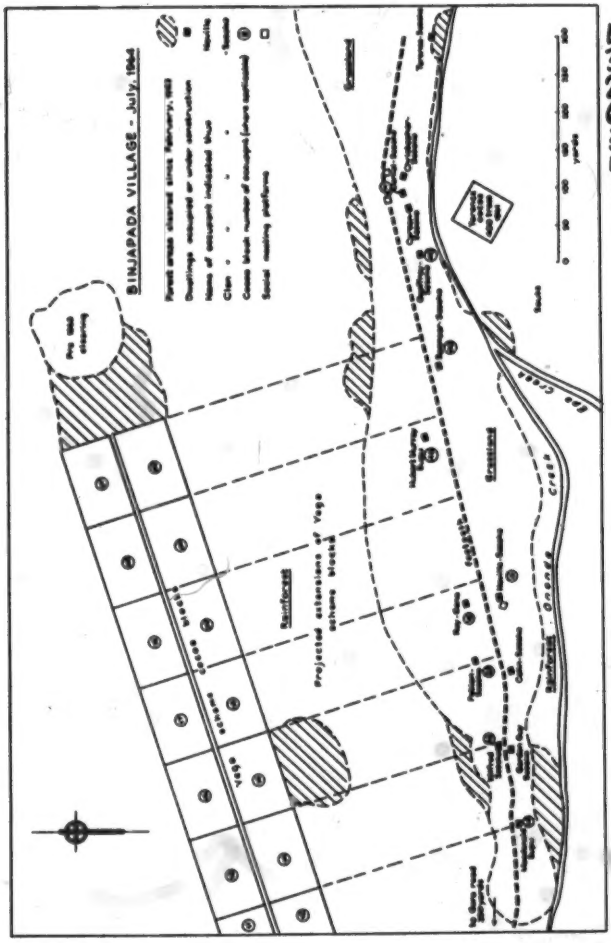

Figure 6

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Figure 7

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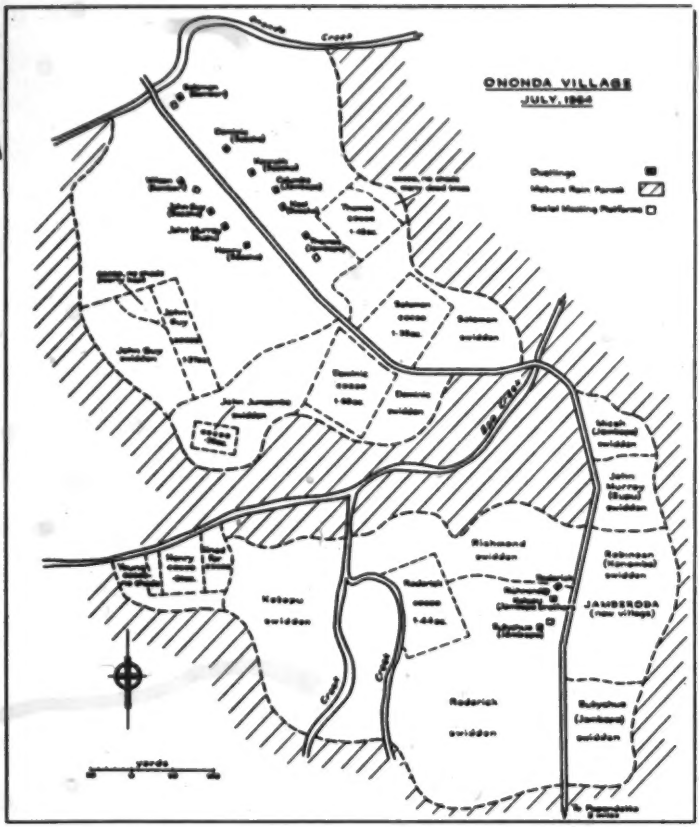
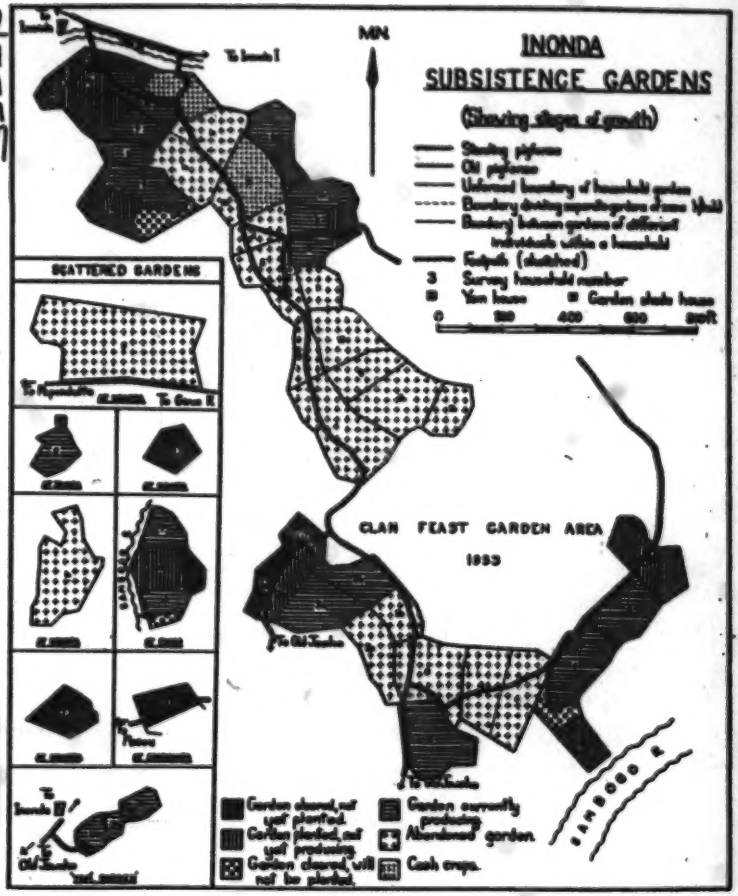


14: Crocombe & Hogbin E-5 (no date) 1963 QJ23 Orokaiva QJ23
Inonda



14: Crocombe & Hogbin E-5 (no date) 1963 QJ23 Orokaiva QJ23
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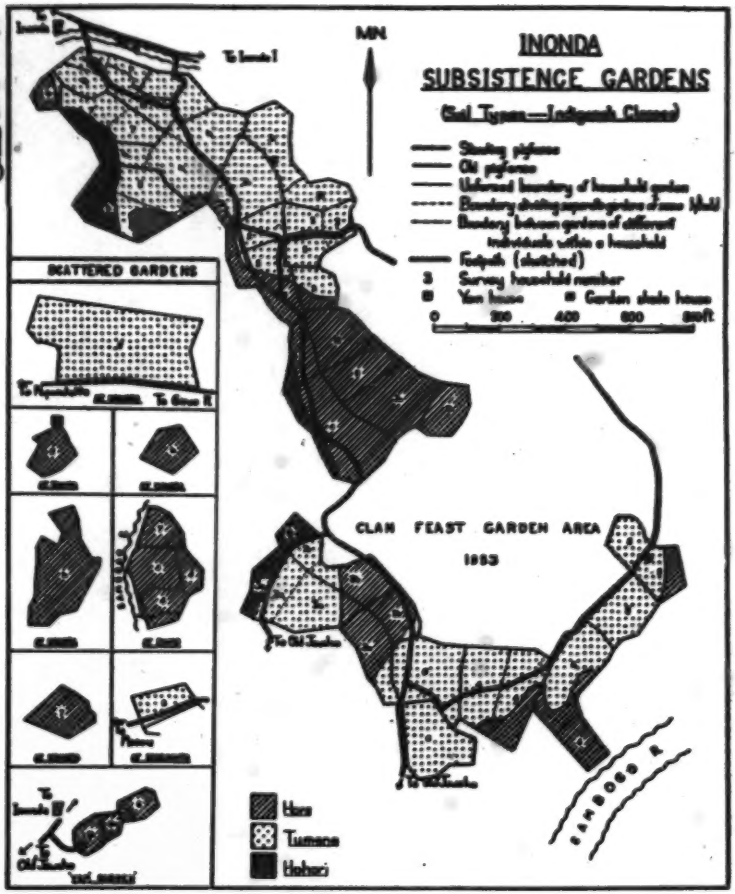

423 This has been documented by recent research carried out in three
614 Orokaiva areas: at Inonda by Crocombe and Hogbin (1963:28), among the Yega by Dakeyne (1965), and at Sivepe by Rimoldi (1966:95).

[361] Under the traditional Orokaiva tenure system most individuals
[241] have rights to several pieces of land scattered throughout the area claimed by the clan. Thus an individual often has to walk some distance from one food garden to another and he may have only a small area of land on each plot. These facts were significant in determining the attitudes of the Ombi-Tara people to tenure conversion (see Chapter 3).

An individual is considered to have a presumptive right to clear bush behind his plot in order to extend his planting, without consulting other members of the clan.

423 Clearing of bushland is often a community affair, with the
311 lineage and sometimes the whole sub-clan co-operating, but planting
241 is organised by individual households, with some reciprocal assist-
476 ance from other households for specific tasks at irregular intervals.

Land use

241 The Orokaiva grow their crops using a system of bush fallow
311 rotation - sometimes called shifting cultivation - which is common in many tropical areas. Newton (1960:81) describes it as a system under which land is cleared and cropped for two or three years, after which the cultivator allows it to revert to natural vegetation cover and shifts to a new garden. He may abandon land because depletion and erosion cause declining yields, but in many instances he does so because less labour is involved in clearing new land than in using old gardens where weed and pest species are established. Brookfield and Brown (1963:166) suggest that in the absence of fertilisers, capital equipment and improved techniques of agricultural production, no successful alternative to bush fallow rotation has yet been found for tropical agriculture.

Residence patterns

361 The Orokaiva live in villages but each nuclear family usually
[592] occupies a separate house. In pre-contact times villages were large, probably because clan members clustered together for mutual
[621] protection (Williams 1928:155). However, in 1928 Williams noted a growing tendency for small groups to form independent settlements.
[614] Families sometimes lived 'for weeks at a time in their garden houses...no small distance from the permanent village.... Some families...settle permanently on the site of their distant gardens' (Williams 1928:129).[1] The present fairly large village appears to be a relatively recent return to the pre-contact pattern.

[1] Native Regulation No.90 of 1922 stated: 'The practice of people abandoning their old homes in settled villages and scattering

654 Planting of cash crops on converted blocks has proceeded steadily.
657 The forty blockholders at Ombi-Tara planted an average of three
311 acres of high-yielding rubber each in the first fourteen months.
241 At Barisari fifty-six blockholders have planted an average of two acres of coconuts in fourteen months and this was expected to increase to four acres by the end of 1966 (Williams 1966:6). Blockholders at New Warisota have planted an average of three acres of cocoa after eighteen months. By contrast, fifty-seven farmers at the Yega scheme have averaged slightly less than one acre of cocoa planted in more than three years.

654 A rough attempt was made to estimate the value of the time,
657 materials and services expended on the conversion schemes in the Popondetta area.[1] This worked out at approximately $8 per acre[A] or $162 per block.[B] This suggests that the growth of conversion throughout Papua-New Guinea on a sufficient scale to have a significant economic and social impact will depend, inter alia, on the development, with experience, of less costly technical and administrative procedures.

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1 See Appendix A.[C]

A [Corrigendum: For $8 read $6--Analyst]
B [Corrigendum: For $162 read $116--Analyst]
C [See Category 423, pp. 38ff.--Analyst]

242 Department of Agriculture. Clonal seedlings for the nursery were
249 obtained from Malaya and from the Agriculture Department's experi-
[654] mental stations at Itikinumu and Bisianumu. Villagers can buy seedlings at 1 cent per stump.

While the seedlings were growing, several meetings were held in the two villages to discuss how the rubber should be planted. The suggestion of a communal plantation received little support, which is not surprising in view of the recent failure of the communal
[423] cocoa experiment. At these meetings the Agricultural Officer suggested that each man might plant some of the new high yielding
[425] rubber on his own land. He was supported in this by Charles and eventually the people asked for individual blocks of land. There appears to have been no opposition.

657 The history of conversion at Ombi-Tara admirably illustrates
177 Fisk's contention (1964:139) that the personality and character of
654 the administrators, officials, missionaries and other members of the advanced sector involved are often as important to the success of a planned programme of intervention in a subsistence economy as the composition of the programme itself. Although the Agricultural Officer has since left the country he is warmly remembered by the Ombi-Tara people. It is a tribute to his understanding and tact that most of the villagers consider conversion was their own idea.

The significant role played by Charles in gaining the approval of the Ombi-Tara people demonstrates the value when introducing innovations in a rural community of working through an influential member of that community. After studying the introduction of changes in techniques in a Victorian country area, Emery and Oeser concluded (1958:52-3) 'No matter how highly regarded he may be the District Agricultural Officer remains, sociologically speaking, an outsider' and has much greater effect if he works through a local leader. These findings are extremely relevant in Papua-New Guinea where the sociological gap between Agricultural Officer and farmer is far greater than in Victoria.

The new land system

657 The new land tenure arrangements were worked out by the villagers
423 and the Agricultural Officer during late 1963 and early 1964. It was decided that 800 acres of the total area claimed by the two
[311] clans should be converted into forty blocks of twenty acres (see the conversion plan on p.12). Most of the 800 acres was formerly covered with bush and appears to be of relatively uniform agricultural potential.

657 The unconverted land outside the scheme has not yet been surveyed
423 and estimates of its area vary from 2,000 to 4,500 acres. All
425 rights to land held by individuals before conversion have been
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Allocation of blocks

659 The principles applied by the Ombi-Tara people in the allocation
423 of blocks are not clear, but it appears that men tried to get blocks
425 on land in which they formerly held rights. It seems that no single person controlled the allocation of blocks but that each person claimed the block he desired. We were told that two people claiming a single block settled the problem themselves without reference to a third party.

[614] As far as possible men claimed blocks on land recognised as belonging to their own clan; thus the three men of Kuai clan at Ombi got blocks furthest from Ombi village, about two miles away. One man of Musu clan was given a block on Kuai land, reportedly because of a shortage of Musu land. The Kuai clan leader said he was very happy to give him a block on his clan's land because 'we are doing a new thing and we want to be friendly with each other and not fight as we sometimes did before'.

The forty-three blockholders[1] include thirty-five men resident in Ombi and Tara villages; two men each from Ombi and Tara who were absent working for wages; a man of Musu clan who lives in a neighbouring village but intends to move to Ombi in the near future; two Anglican Mission staff, one a Bishop due to transfer soon from Samarai to Popondetta, the other a priest stationed at Sasembata, about three hours' walk from Ombi;[2] and the Papuan Agricultural Assistant who is stationed full time at Ombi-Tara. None of the last three people has kin ties with any person at Ombi-Tara.

Clearing and planting blocks

249 Blockholders began clearing the portion of their blocks nearest
476 the access road soon after the preliminary survey of July-August
[311] 1964. For clearing the villagers worked in several groups, with
[654] each group spending one or two days on the block of each of its members. The first one year old G.G.I. (Malayan) rubber stumps from the Department of Agriculture nursery were planted in late September 1964. Planting was done by individual householders and their families, with only occasional help from kinsmen. It is traditional Orokaiva practice for clearing of bush to be undertaken by groups of kinsmen but for planting to be carried out at the level of the individual household.

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[1] 'Blockholder' is used for convenience throughout the rest of this paper to refer to the forty-three people who have applied, or intend to apply for blocks.

[2] It is not clear for what purposes these two blocks will be used.

Security of tenure

423 241 [182] [829] It is often suggested that the main benefit from tenure conversion is the provision of security of tenure for villagers who wish to plant cash crops. The Ombi-Tara people, however, did not consider security of tenure as a major benefit of conversion. They explained that each man had previously held individual rights to land which were sufficiently secure for him to plant cocoa and coffee. A man could plant such cash crops without consulting the clan leader or other members of his clan, and without others disputing ownership of the crop or distribution of the proceeds.

[578] Fourteen people did mention that conversion and the introduction of cement and *wooden corner pegs would help to prevent disputes;* but they felt the disputes to have been caused by the previous small size of individual plots which sometimes made it difficult for a man to extend his planting (because he would be encroaching on another's land); and to vagueness of boundary lines. Some also referred to the need to clearly mark out land boundaries to forestall potential encroachment by persons from outside Ombi-Tara.[1]

Consolidation of holdings

423 311 361 [829] Most Ombi-Tara people saw consolidation of their previously scattered holdings as the main benefit from tenure conversion.[2] Many people drew finger diagrams on the ground to explain how conversion led to consolidation. Under the traditional tenure system cash cropping involved long walks from village to food gardens and to cash crops.[3] Consolidation not only reduces walking time, but also allows an individual to undertake large-scale planting in a single area. He was previously unable to do this because of the small amount of land he held in each plot, and in some cases because of the small total amount of land to which he

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[1] In contrast to the Ombi-Tara situation Crocombe and Hogbin (1963:72-80) found in another Orokaiva village that lack of security of tenure was a factor discouraging certain individuals from planting cash crops.

[2] Mentioned by thirty of the thirty-seven blockholders interviewed, including the four most influential people - Charles, the two clan leaders and the Local Government Councillor. These people should be distinguished from the 20 per cent or so mentioned earlier for whom the innovation of conversion was less significant than the change to planting rubber.

[3] Waddell (1966:7) found in another Orokaiva village that time spent travelling to and from places of activity was about 15 per cent of the total time devoted to that activity.

had rights.[1] Conversion has caused a redistribution of land rights, with some people losing and others gaining land. Several men who claimed they had less land after conversion than before said that twenty acres was ample for their needs and that they were pleased to give up some land to help their co-villagers.

There are indications that conversion at Ombi-Tara has facilitated co-operation between villagers who are planting cash crops. Previously any man who wished to plant cash crops had to work with little assistance, often in a relatively inaccessible area. Since conversion has been introduced, the new road gives easy access to all blocks and people are more easily able to help one another.

Paradoxically, conversion to individual holding of land appears to have strengthened intervillage, interclan and interpersonal co-operation and to have fostered a community spirit. Intervillage co-operation is demonstrated by the establishment of a joint Ombi-Tara bank account to purchase equipment for the bush rubber processing unit, and by joint discussions on the nature of the new tenure system. Interclan co-operation is seen in the leader of the Kuei clan granting permission for the allocation of a block on Kuei land to a man of Mumu clan. Interpersonal co-operation is illustrated by the apparent willingness of large landholders to give up all previously held land rights without receiving any compensation, in order to enable all to take part equally in the scheme.

The Ombi-Tara people are pleased and flattered that many people visit and inspect the blocks. They heard that Ombi-Tara was mentioned on the radio and are happy that others ('people all over Papua-New Guinea') should know of their experiment. When two Australian friends of mine paid a short visit to Ombi they were asked with expectant pride if they had heard of the Ombi-Tara scheme in Australia. The leader of the Mumu clan said, 'We want Ombi-Tara to have a big name like England, Japan, Hong Kong, Rabaul and Lae'.

Publicity and information

Most Ombi-Tara people (82 per cent) said that they first heard of the possibility of converting land to holding under individual title after the visit of the Agricultural Officer in late 1963. No one reported hearing first about conversion through Local Government Councils, from the Anglican Mission, on the radio or through

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[1] The then District Agricultural Officer considered consolidation of fragmented holdings to be one of the main benefits that would emerge at Yega, the first tenure conversion scheme in the Northern District (Belfield 1962:1-2).

Chapter 4

Effects of conversion at Ombi-Tara

Land use

657 423 182 Since conversion the blockholders have each planted an average of three and a half acres of high yielding rubber and some have cleared a further two or three acres in preparation for further planting.

311 241 Most households are interplanting their food crops with the rubber seedlings as they say it saves time and effort if all crops are on one plot instead of scattered as before conversion. Thirteen people reported that they have food crops growing on unconverted land outside their blocks. Six of these had blocks about twenty-five minutes' walk from the village, and have planted some food on clan land closer to home. Three of the others said that they intended to transfer their food crops on to the blocks shortly. Three people reported that they have coffee trees which were planted before conversion growing outside the block.

[614] The Ombi-Tara people intend to keep the clan land outside the converted area for use by future generations or by members of the present generation who wish to expand their holdings.

Residence patterns

657 423 182 Those people whose blocks are closest to the village have tended to remain in the village. Those with more distant blocks have either abandoned their village houses and moved to the blocks - six families have done this - or planted some food crops on clan land [361] close to the village to avoid having to walk long distances to get food.[1]

[592] The traditional Orokaiva custom of living in single family households has been maintained, with only four of the thirty-five households at Ombi-Tara containing more than one family. In three

[1] Dakeyne (1965:136) notes that the Yega people moved on to their blocks soon after the Yega conversion scheme began.

121 The need for credit at Ombi-Tara where rubber is being planted
452 may be less than at schemes where other crops are being promoted.[1] Bauer (1948:318) stated that where tapping and processing of rubber is done by family labour, 'many small-holders could almost be referred to as no-cost rather than low-cost producers'. The visiting World Bank mission suggested that credit could play an important part in securing local interest in planting rubber in consolidated areas, in organising group processing and marketing, and in providing scope for enterprising men to increase production (International Bank for Reconstruction and Development 1965:111).

It has been suggested both by the District Commissioner (Williams 1966:7) and by a former Agricultural Officer in the Northern District (Cheetham 1962:67-78) that it may be an appropriate time to reassess official credit policy, looking particularly at the criteria for providing credit to smallholders. Cheetham (1962:77) concluded: 'A farmer's ability to repay may be a better criterion on which to provide loan capital than the present notion of "credit-worthiness" in the sense of adequate tangible farm assets.'

Cash cropping and productivity

657 It is too soon to determine the effects tenure conversion will
423 have on cash cropping and productivity. However, even at this early
182 stage a few observations may be made. The acreage under cash crops at Ombi-Tara has increased significantly since conversion. Before
[311] conversion was introduced, 167 cocoa trees, 92 coffee trees and 19 bush rubber trees were planted per adult male at Ombi-Tara.[2] In the fourteen months after the villagers began planting high yielding rubber on the converted blocks an average of 304 seedlings was planted per adult male.

[434] There is no shortage of food or suitable agricultural land. Both terrain and climate are favourable for growing rubber. There is easy
[464] access to Ombi-Tara from Popondetta. Villagers are able to earn money to buy rubber seedlings from the Department of Agriculture by tapping their bush rubber, by working on road maintenance, or by working for wages on the Sangara ex-servicemen's plantations. The proximity of the Sangara plantations and the existence of bush rubber stands at
[177] Ombi-Tara provided villagers with experience in tapping and handling rubber. The Sangara plantations also serve to demonstrate a 'European way of life' which many villagers find attractive and wish to emulate.

[241] Tenure conversion appears to have contributed to the improved cash cropping performance mainly by reducing the labour inputs required to establish cash crop gardens, thus increasing labour

[1] For example, the processing of green leaf into tea requires substantial investment (Clayton 1961:623).

[2] Excluding the two 'outside' blockholders and a man from Tara who declined to be interviewed (see p.1).

433 were introduced. The use of these tools has
241 greatly lightened the work of the New Guinea
173 gardener and substantially reduced the time
[412] needed to produce his vegetable foods. Thus time was available, when the incentive was supplied, to produce crops which could be sold for cash.

241 The introduction of new tools has not, how-
242 ever, had any marked effect upon the methods by which a New Guinea villager produces his food crops. Long ago he discovered by experience what agriculturalists have later discovered scientifically, that tropical soils when exposed to the sun and rain very rapidly lose their plant nutrient content (particularly nitrogen) and without the addition of fertilizer they will not sustain crop yields. In order then to make the most efficient use of cleared land, the villager plants his swidden with a variety of food crops, mainly tubers, which, maturing at different rates, help to maintain a constant food supply. Swiddens are usually abandoned after twelve to eighteen months and allowed to return to forest. Meanwhile new clearings are made and crops planted to ensure continuity. Forest is allowed to regenerate on old swidden sites for a period of five to twenty years depending on the population density and consequent pressure upon the land. Provided that the forest cover is left for about ten years between periods of cultivation, soil deterioration does not usually occur. Under this system of land
241 use, which can best be described as one of
242 shifting-field agriculture, the average land requirement is a quarter of an acre per head per
311 [P.I-B]

241 242 317 year. Thus, over a ten-year land-rotation cycle, approximately two and a half acres of land are required to support one person.

241 433 177 [437] The major change that has occurred in New Guinea agriculture with the coming of white men has been the introduction of cash crops. When Europeans first arrived they found a subsistence economy. Some trade was conducted but it was almost entirely by barter and was confined in the main to items of ceremonial value, shell and feather ornaments and the like. The early administrators, both British and German, were faced with the problem of rapidly easing the financial burdens their colonies imposed on the mother countries. The only readily apparent way to do this was to encourage the production and export of copra, the dehydrated meat of mature coconuts which grew prolifically in all coastal areas. Accordingly villagers were encouraged to produce and sell copra to itinerant traders; this village or 'trade' copra was the mainstay of the colonial economy for many years until production from large scale plantations was built up. First coconuts, then rubber, coffee, and cocoa and latterly tea and pyrethrum were grown on plantations owned and managed by white men who directed gangs of indigenous labourers in the tedious tasks of keeping the jungle at bay and processing the crops. Since 1950, Administration policy has changed in favour of encouraging the production of tree crops by indigenous growers on small plots of village land or, in certain areas, on small plantations of ten to forty acres. This policy has brought into sharp focus the difference between our land ownership system and that of the New Guineans.

423 Flying over New Guinea and looking down on vast areas of trees or grassland, with no apparent occupants apart from an occasional village, one may be tempted to think that there is a great deal of vacant or unclaimed land. This would be erroneous. Some indigene claims rights to every square foot of land under 7,000 feet and to much of the higher land as well; in many areas the rights claimed by one man are disputed by several others.

The European concept of individual land ownership must be discarded when considering New Guinea custom. Similarly the phrase

[P.2-A]

602 Kinship groups are of major importance in the functioning of village society in New Guinea. Every individual is a member not only of a parish but also of groups of closer kin, a clan, and maybe a lineage. Lacking any system of payment in cash for services rendered, the villager obtains the assistance of his relatives for heavy work such as the felling of big trees to make a swidden, dragging a canoe log to the beach, or making a long seine fishing net. Obligations thus incurred are met either by reciprocating when asked or by making a gift. The kinship group provides social stability and in practice the pattern of land use is frequently decided by the senior members of the group. The planting of food crops by any member, even on land to which he does not control cultivation rights, causes no concern because rights to temporary usage may be easily granted, but the planting of tree crops, which may remain in the ground from thirty to eighty years, is a different matter. Planting tree crops is tantamount to alienating the land for at least a generation and very often some members, at least, of the kinship group object to such long-term use. Even if they do agree to an individual member planting tree crops, there is almost always the assumption that he must share any profit he makes with other members of the group. Individuals who have planted cash crops under these conditions generally become discouraged when they see the fruits of their labours being reaped by kinsmen who contribute little or nothing towards production.

657 In its attempts to stimulate production of cash crops by indigenes, the Administration has approved a series of land tenure laws, the last and most radical of which was passed in 1964 providing for the registration by indigenes of individual freehold title to land: a measure designed eventually to establish a European system of land tenure throughout the Territory. In the meantime, such measures, by pitting traditionally conservative people against the products of modern Western education, are a cause of internal conflict within indigenous society.

632 The establishment of towns, unknown before the coming of Europeans, has forced an even more drastic adaptation than have the

(P.3-A)

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Fig. 3. Main areas of subsistence gardens of one Yega clan (Kurou clan)

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within his sub-clan so that all sub-clan members may be found working land in close proximity. This custom was necessary in the past for mutual protection against raiders. It

[P.7-B)

[NEXT CONTINUED ON PAGE 8-B]

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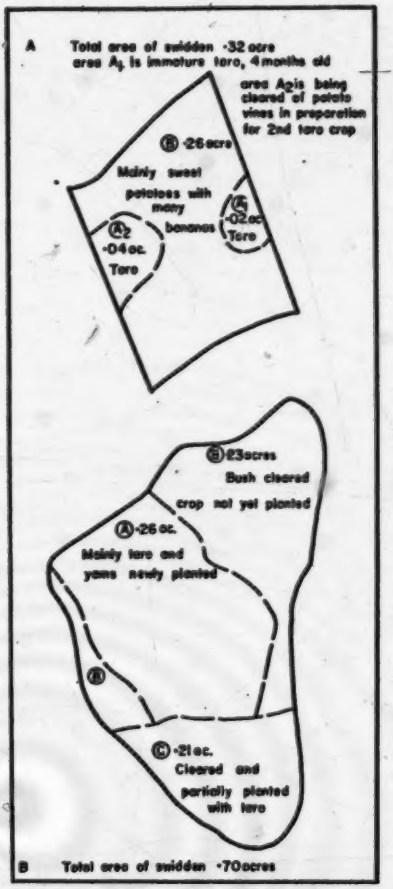
A Total area of swidden ·32 acre
area A1 is immature taro, 4 months old
area A2 is being cleared of potato vines in preparation for 2nd taro crop
B ·26 acre
Mainly sweet potatoes with many bananas
A2 ·04 ac. Taro
A3 ·02 ac. Taro
B ·23 acres
Bush cleared
crop not yet planted
A ·26 ac.
Mainly taro and yams newly planted
C ·21 ac.
Cleared and partially planted with taro
B Total area of swidden ·70 acres

Fig. 5. Examples of Yega swiddens, illustrating the method of maintaining continuity of food supply

241
242 obviously play an important part in the selection of a swidden site.

[P.9-A]

January 1951. The failure of this scheme emphasises the important role of the individual leader in any innovation in New Guinea.

An important modification to the residential pattern resulted from the Agricultural Co-operative. Not only was co-operation practised in the gardens but co-operative theory was preached as a Christian ideal in the churches and taught in the schools and training colleges of the Anglican Mission. The teachers emphasised the practical advantages of living in a large community; for example, co-operative labour could be easily organized, social clubs could function more readily and school, church, and hospital would be more readily accessible to the majority. Most Yega accepted this view and, during 1953, many of them rebuilt their houses in a planned rectangular village, Beporo, close to the mission station (Figs. 4, 12). Here there was a tendency for the household heads of each clan to group their dwellings together and to maintain the same inter-clan relationships as had existed in the smaller villages. Nevertheless, there was a breakdown in the previously tight social control over the location of dwellings. Some men exercised this freedom by building away from their clansmen but near to their wives' kin and in some instances even sharing a dwelling with them.

Since 1960, seven new inland villages have been established along the road leading from Gona mission to the town of Popondetta. This movement inland from the coast was initiated by the development of a cocoa-planting project which is without doubt the most significant change in land use to have occurred yet. In 1960 the old wartime road between Gona and Popondetta (actually the last stage of the Kokoda Trail) was re-opened by the efforts of the Anglican missionary living at Gona. It gave access to land at Ononda which in the opinion of the District Agricultural Officer (DAO) was suitable for cocoa. As the Yega had previously made enquiries about planting cocoa, the DAO now advised them to clear a large area of rain forest and plant their cocoa in a continuous strip, which would then be sub-divided into individual blocks, rather than in the small scattered plots which is the usual pattern of indigenous cash crop plantings.

[P.15-A]

21: Belshaw E-5 (1951) 1951 OJ23 Orokaiva OJ23
Mount Lamington

731 remember the dead in such ways. In the meantime one may hear the drums beating
765 in some villages as the men spontaneously come together for recreation and practice.

The programme of reconstruction, then, is very much a matter of the allocation
731 of time between such ends. To regard it simply as a matter of building houses and
making gardens would be a mistake. But even within that simple framework the
311 rate of reconstruction is dependant upon the availability of resources and the organization of work. It was estimated that the re-established population would have about five acres of land per head outside the danger perimeter—over 100 to the square mile. This is small compared with other areas of Papua, but it is held to be sufficient to maintain present standards of shifting cultivation. The forest building resources, with the possible exception of grass and sago thatch, appear to be adequate for immediate purposes, and it is hoped that thatch can be imported from near by areas. But there are indications, as we shall see, that agricultural requirements may alter; and it is not certain what effect this dense population will have on permanent timber resources. As against this, the people are permitted to extend gardens into the danger perimeter provided they do not stay there overnight. Unfortunately the immediate benefits of this are reduced by the fact that taro and other gardens are choked by weeds and the roots have in many cases rotted. It will take time to build up a stock of reliable seed and to turn this into good crops.

731 Papuans, and particularly the Orokaiva, work with great vim and energy when
461 they can work as a team, within sight and sound of each other. The melodious song that rose as village groups combined to fell the forest on their new sites was exciting, and as the song died away the rhythm of the work continued, this time accompanied by back-chat and joking. All reconstruction work cannot take place with such groups—timber and cane materials, for instance, are gathered by people working apart from each other. But attempts were made to increase the frequency of directly co-operative work by a typical modern Papuan device, the allocation of work days by village constables and councillors, acting after a village meeting.
[657 The custom of Government Day, the day a week which is set aside for village hygiene
797] and improvement, is universal in Papua. To this has been added, in some cases, a Mission Day, set aside for work in support of Missions. From this it is an easy step to allocate work for the week in such a way that most villagers will be doing the same type of job on the same day, and hence the possibilities of co-operation are increased. In most of the reconstruction villages Monday and Wednesday were set aside for house building, Tuesday and Thursday for garden work, Friday for hygiene and road construction (the latter a most important activity in the area at the present time), and Saturday free or for Mission work. This calendar was somewhat complicated by the rather inopportune demand of the Mission for a tithe of labour to expand Mission stations in the area, a task that could well wait until the people are more settled.

657 So far I have been writing mainly of the immediate problems of re-settlement. The Administration is however taking a much wider view and there is a great deal of

22: Schwimmer E-4,5 (1966-1967) 1969 QJ23 Orokaiva QJ23
Mount Lamington

Map III

Source: Rimoldi 1966: 52

(End Map 2)

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134 the numa of Sivepo, but it is far shallower, less well drained and
[241] covered with kunai grass (predominantly imperata sp.). It is not used for gardens because of the difficulty of freeing the ground from grass roots. (ii) the Girua Association: coarse textured, recent riverine deposits lying beside the Sambogo and Girua Rivers. This soil, called tumena is the favourite gardening land. (iii) the Warisota Association: recent, well drained medium textured clay loams, becoming fine textured with depth and found on the Hydrographers foothills. They are grey to grey brown, and are called hora or hohori. They are not favoured (though occasionally used) for gardens, as they tend to dry out during the dry season, which is much longer and dryer than at Sivepo. The other two soil types are too stony or sandy to be used for anything except foraging and hunting.

162 There is a striking difference in population density between
161 the two districts. Sivepo, with a population of 137, occupies and owns about 0.75 square miles of land, an average of about 180 persons per square mile. We may compare this with Inonda, with a population of 45 and about four square miles of land--an average of 11 persons per square mile. Sivepo is not at all untypical for the Saiho Census Division in which it is located; this is the division which includes the Mount Lamington foothills as well as some sparsely populated areas in the vicinity. Average population density in this division is 75, with local densities of 200 and over "not at all rare" (Rimoldi, 1966: 4). Inonda also has a population density characteristic of the census division in which it is located; the Buna Division is occupied by about eight persons per square mile (see Table 6).

161 Rimoldi's analysis shows that the Sivepo population density
311 is close to the upper limit the land can sustain with present technology and social organisation. The sample he chose for study (50 persons of the Jegase and Timunu clans) happened to have less land than the average, namely a total of 138 acres. He showed that of this area, 110 acres are required to maintain present standards of subsistence agriculture (1966: 20-21). This leaves hardly any margin for land unsuitable for cultivation and for unequal distribution of land as between families. It also makes little provision for a balance of forest land which must be preserved, as forest resources are essential for the maintaining of the Orokaiva economy. It is true that the other major Sivepo clan (Saho) has greater land resources, and that the Saho people allow the others to use forest trees from their land for building and other purposes. Nonetheless, land resources are almost as tight as they can be.

In contrast, Inonda has plenty of room. When Seva Village joined Inonda after the eruption, there was plenty of garden land for everybody. Crocombe and Hogbin claim that 580 acres may be classed as good garden land, whereas the present level of subsistence gardening can be maintained with 127 acres (1963: 10).

361 cultivating gardens that are more than a mile or so away from his village.

When Rimoldi made his careful notes of cultivated gardens,
241 these seemed to be predominantly in the Northeastern part of the
311 village domain. These gardens are ordinarily fallowed for eight years or so and then cultivated for one season. The gardens in the Southwestern part of the village domain were undoubtedly being cultivated shortly after the eruption; they are again being cultivated today. It therefore seems to make sense that after the eruption people were living in Pamba, in that part of the domain and that the new Sivepe is again in that area.

731 Inonda experienced three shifts since the eruption: first
361 to the vicinity of the airstrip (1951), then to the village described by Crocombe and Hogbin (1955), then to the village where I myself stayed (established 1964; see Map VII).A The pre-eruption village was just behind this new village, again suggesting an orderly exploitation of garden land. In 1964, Inonda returned to garden land that had been fallowed since the eruption. People told me that before shifting to the present site, they had to walk much too far to their gardens.

361 While the layout of Pamba was traditional--with the houses
659 close together and little space between the rows--both post-eruption settlements of Sivepe and all the four post-war Inonda settlements followed what one may call the Australian standard plan: two fairly regular parallel rows of equidistant houses facing each other, with a few houses joining the two rows, thus forming a quadrangle, and a wide field in the middle, used for playing soccer and basketball and as a separation of the two "halves" of the village which tend
[364] to belong to different clans. A modern village will contain, in addition to residences, privies for each family, while some have
[345] built a hall for the women's club, sponsored by the government. Inonda built a very stylish one, using as a floor a slab of concrete
[595] which the Americans laid down during the war. Sivepe got no further than the foundations, after which a quarrel blocked progress. In addition all villages contain a number of arara or jataka--covered platforms where men sit and receive visitors. Many villages, including
[591] Sivepe, still have a bachelor's house. Typically, each house is occupied by a two-generation family comprising no more than one married couple. A stream is always close to the village.

The change in village layout as between Pamba and the two later Sivepe villages must be discussed in a little more detail as the eruption was clearly influential here. The Australian government has long been concerned about village layouts; this interest went beyond consolidations and included the improvement of housing
657 standards, village sanitation and roads. We find Wilfred Beaver,
364 in the Annual Report for 1914-15, already claiming that he had "insisted on these three essentials in village life," in the

A [See Cat. 116, p. End Map 7--Analyst]

657 Sivepe, as it happens, was one of the villages in which the plan
361 was pioneered.

Finally, I should refer briefly to communications. One
[491] general effect of the eruption was a shifting of villages to the side of jeep roads, as Belshaw also mentioned. The administration favoured this trend which greatly facilitated patrolling the villages. The Orokaiva always seem to have a liking for the Australian-built roads; Monckton already refers to their fondness for travelling over it and explains it gave a sense of security against possible attack by hostile tribes. Though this can hardly be the reason today, the liking remains. Over the last few years, the roads have begun to yield economic and practical advantage: trucks collecting coffee visit the villages and occasionally people can pick up rides from passing vehicles. Speed of travel is also improved for pedestrians. I shall discuss ideological aspects of this liking later.

872 The accessibility of facilities has also improved since
797 the eruption. Sivepe children now all go to the school at the Sasembata mission station which teaches up to Standard 6. Inonda children were first introduced to schooling after the eruption when the Seva people joined them accompanied by a mission teacher.
[368] After this mission teacher retired, Inonda was dependent on a school at Hohota. Only a few children went to this school because it was six miles away, across a deep river, but today, after the building of a new road and a bridge, and the latest shift of Inonda village, this distance has been reduced to about three miles and school attendance is regular.

368 The eruption changes the centre of gravity of the district.
731 The pre-eruption settlements of Higaturu and Sangara contained all governmental and mission facilities, including the hospital and the schooling past Standard 2. Sivepe's link with these facilities was by a bush track running through Isivita. Today, Popondetta is the centre, but the hospital is at Saiho, the senior college near Agenahambo, the Local Government Council in the new Higaturu, near
[491] Agenahambo. Thus the main road to Popondetta, now greatly improved, has become the main artery. Nonetheless, for those who have to walk, the bush tracks from Sivepe to Saiho, Awala and Agenahambo are still important thoroughfares used by many dozen people every day.

Section 4: Resources

423 I have already referred to the main resource, owned by the
311 Orokaiva, which is their land. The Sivepe people own only about 480 acres, almost entirely gardening land, and very little of their land is in virgin bush. This small area is useful for certain

311 products, such as slow-growing trees, which are used for house
423 posts, drums, and other artifacts. A great deal of Sivepe land is in young bush but this is fallowed garden land. After eight years or so, it grows sizeable trees, and sometimes it is fallowed for much longer. In this bush, many trees may be found that have actually been planted by man and are owned by individuals. Prominent among these are breadfruit, various nut trees, fruit trees and trees with other specific uses. Some of these are
224 deliberately planted in bush. People go to the bush to collect
[222] these, to forage and to hunt. Although hunting expeditions do occur periodically, and cause much excitement, they yield very
[136] little meat. Not only is the area too small to contain much game, but also it appears that very few birds and no game apart from
[411] small marsupials are actually still left. The same is true for the rivers which contain very little fish. I could not help wondering, in fact, whether the meat collected was an adequate
[262] return for the number of cartridges used to kill it. Hunting expeditions occurred only when there was a feast, and when the offering of fresh meat to guests was especially desirable. (Tinned meat might be cheaper than the cartridges but much less esteemed.)

311 In this respect, the situation was very different in Inonda where only a fraction of the land was used for gardening so that almost all of it was hunting land. Most of this was in kunai grass, which was very often burnt over. The effect of these burnings was very often that good garden land also fell a victim to fire,
224 valuable trees were destroyed and villages endangered. The yield
223 in meat was much higher, however, so that in Inonda, meat actually became an economic resource: it was sold on the market and used as gifts in return for feathers and other valuables. There are more birds at Inonda than at Sivepe, more marsupials and also a good chance of an occasional wild pig. Neither at Sivepe nor at Inonda is there evidence today of the use of traditional hunting techniques, though traditional fishing techniques have survived.
[411] The decline in game and fish population is ascribed to the intro-
[295] duction of guns and snorkels which greatly increased yields for some years, but then led to a greater scarcity than had ever been
[199] known in the past. Guns and snorkels were introduced shortly after the second world war.

There are two kinds of domestic livestock: pigs and fowls.
231 The number of pigs has, as I already pointed out, declined greatly in both villages. It was impossible to know how many pigs were owned by Sivepe people in 1966-67, because they disappeared as the old village became deserted and were never seen at all in the new village. Rimoldi reports 24 pigs owned by his sample of 50 Sivepe people alone which suggests that even in 1963, when he stayed there, the whole village must have owned at least 60. During my period of study, only a few of them were killed, and only when

231 they marauded gardens, so that I assume that a good number could
be rounded up if Sivepe were to hold a major feast. They were not
at all accessible, however, and none were caught during such hunting
[422] expeditions as the people organised. On the occasions when marauding
pigs were shot, the pigs were always recognized and presented by
the killer to the owner who then presented his pig to some other
person. No doubt these pigs were a resource and perhaps I was at
fault for not taking a census, but with no pigs visibly in evidence,
I considered these assets as too shadowy. In Inonda, where Crocombe
and Hogbin reported 12 pigs in 1962, only two were left in 1966.
235 My prognosis for pigs as an economic resource is poor. The fowl
[262] population, on the other hand, had remained very much as it was at
these earlier investigations: eggs were discovered and eaten
occasionally, but the use of the fowl was for feasting when visitors
[239] had to be entertained. It was also noticeable that the roosters
[293] were deprived of many of their choicest feathers at a time when
headdresses had to be refurbished for dancing or spears decorated.
[411] At a visit from Togahou, which by traditional etiquette, as I
understand it, should have rated at least one pig, the people of
[579] Sivepe killed only fowls. This was, I was told, because there
were no pigs available; hence the fowls were a proper substitute.
It would seem that the fowl is rapidly becoming the substitute for
the pig on many ceremonial occasions, though not yet for all
occasions.

There is a great shortage of both pigs and fowls for these
438 ceremonial occasions. Pigs are bought for high prices ($20 to
439 $30)--from neighboring villages and even, as Crocombe and Hogbin
say, from European planters. Fowls tend to be made available on
[435] big occasions by whoever has them so that their number does not
increase--a few dozen in each of the two villages.

We may distinguish, among local plant resources which yield
241 economic products, those plants which are native to the district
● 311 and those which have been introduced by Europeans for cash cropping
purposes. Starting our survey with the former of these two
categories, we shall deal first with food plants and next with
economic trees. I have tabulated average food plants per household
as shown for Rimoldi's Sivepe sample and as shown by Crocombe and
Hogbin for Inonda (Table 7).[A] The pattern for the two places is
remarkably similar except that sweet potato is a notably more
important crop at Inonda than at Sivepe. The reason for this is
that it is more dependable under drought conditions such as often
occur at Inonda and also, it seems to do better at Inonda. The
fact that the Inonda taro acreage is higher than the Sivepe acreage
reflects no more than the higher yield per acre in the latter place.
There is no evidence that any major change occurred in the quantities
grown or the methods of cultivation over the period with which we
are concerned, though a small increase in the consumption of
Xantosoma taro may be a symptom that people may be starting to

A [See Cat. 116, p. 212--Analyst]

241 devote less time to the cultivation of the more laborious (but more
311 favoured) Colocasia taro.

During the post-eruption period there have been, as we shall
[433] see below, many pressures on the Orokaiva to reallocate their working time, by raising the standard of village building construction, by taking on outside labour to raise taxes and buy luxuries, by increasing the acreage in cash crops. In many cultures dependent on swidden agriculture these pressures have led to more slipshod methods of cultivation, or smaller plantings or shorter fallowing periods. Among the Orokaiva, the only effect so far has been, in all probability, a decline in the surpluses grown for feasts. This is a change to be discussed later and related to religious changes. In Sivepe there would clearly be a danger, if cash-cropping was expanded to the extent some administration officers would like to see, that fallowing periods in subsistence gardens would need to be shortened. There is no evidence that subsistence gardening, so far, has been affected by cash cropping, as both the acreage and the time devoted to cash crops is too small. (For details of time allocation to activities in both villages, see Table 8.)[4]

245 The average Sivepe family, according to Rimoldi, has 62 cultivated trees of local origin from which crops are gathered in season. No corresponding figure is available for Inonda, but it would be about 30. The list of most important trees varies a little between the two districts because of differences of climate and soil.

Sivepe	Inonda
Coconut	Sago
Breadfruit (oga and eumba)	Coconut
Betelnut (areca)	Betelnut
Sago	Hauga nut (tauga)
Pandanus	Breadfruit
Tauga nut (cycas media)	Pandanus
Puga nut (terminalia okaria)	(Ajimo)
Bark cloth tree (ajimo)	
Mango	

An important difference between the resources of the two villages is that coconuts at Inonda will yield copra; hence, a copra drying house was built and this has been and can be a source
[262] of income. At Sivepe, the flesh is thinner and coconuts are grown for drinking, cooking, feeding dogs and chickens, while the nuts are also eaten regularly and form a useful source of protein. Another
249 difference is that neither betelnut nor tauga and puga do well at all in the Inonda district and quantities are negligible. The lack
276 of betelnuts is felt very strongly, as the Inonda people are as
438 A fond of chewing it as other Orokaiva. Hence, it is usually obtained

[See Cat. 116, p. 213--Analyst]

241 villages had to be abandoned at the time of the eruption and rice
177 growing was never resumed. The growing of rubber by Orokaiva in
[243] the Northern District has a long and somewhat unhappy history which will be referred to later; at the time of the eruption, just before the Korean War drove up the prices, the rubber trees planted by
249 the Orokaiva were hardly harvested at all; Rimoldi reports that
311 in 1963 the existing stands at Sivepa were tapped to some extent and the coagulum sold to a factory at Awala. There were six tappers
177 in his population sample of 50, who together earned $70 in one year.
[434] When I began my field work, the tapping had ceased as the factory
[474] was no longer buying indigenously grown rubber, but a rubber cooperative was set up early in 1967, with the encouragement of the Department of Agriculture, in a village about one mile from Sivepa. The Department of Agriculture was also encouraging the people to plant superior Malayan rubber trees and two men had planted 250 and 72 trees respectively. Rimoldi reports that "members of the clans now represented in Sivepa and Binduta" owned four plots ranging from less than half an acre to about three acres in area.

Since that time, however, a new plot has been established, four and one-half acres in size, on which theoretically seven men were to establish rubber stands. The Malayan trees were planted here, as well as self-sown trees from the other plots which were dug up and replanted. These plantings occurred shortly after Rimoldi left. If the new cooperative venture succeeds, it is likely that the new plot--most of which still remains unplanted--will be exploited, but people were clearly waiting to see whether sales at attractive prices would eventuate.

245 Orokaiva coffee plantations are wholly a post-eruption
177 development, inaugurated by the Agriculture Department shortly
311 after it was set up in Popondetta and greatly strengthened by the setting up of a coffee cooperative, first under the Higaturu Local Government Council and later independently. First plantings in Sivepa were before 1954, in Inonda in 1955. Rimoldi reported that in 1964, there were 1,100 coffee trees in Sivepa, owned by five growers. Crocombe and Hogbin reported 801 trees in Inonda in 1962, owned by three households. Since that time, Inonda has not added to its plantings, but Sivepa, along with the whole of the Saiho Division, has greatly increased its cash-cropping activities
[434] since the 1964 census. The number of growers has increased from five to 14--every able-bodied man in the vigor of life has his coffee garden from which he derives an annual income of between $50 and $100. This increase is the result of vigorous encouragement of plantings by the Agriculture Department, a change of ideology under the impact of the Local Government Councils and a great improvement in the marketing arrangements. In 1966, Sivepa coffee was collected and promptly paid for in Garoubi village, about 15 minutes' walk from Sivepa. I did not take another coffee census

but would estimate plantings to be about 4,000 trees, occupying an area of eight acres.

Among resources which produce significant current income in Sivepe and Inonda, two other types must be briefly mentioned here, though they must be more fully discussed elsewhere. Income is earned by men who are normally resident in the villages. When these men are married and living away from the village with their families, they provide support to the home people on critical occasions and also, when villagers pay visits to them. I briefly met a few Sivepe men who settled in Port Moresby and these men were called upon, during the year of my study, to pay several plane fares and feed several men who tried their luck in looking for jobs in Port Moresby.

Secondly, men who return to the village after outside employment are bringing savings into the village which forms a significant source of revenue. Such savings often form part of the bride-wealth paid by clansmen and it is thus the affines who spend it. During the year, four Sivepe men went to Port Moresby for employment and three returned; one Sivepe man took up a job on a plantation for awhile, largely to pay overdue taxes; a number of men ordinarily working outside came home for short visits. Probably the most regular income is derived from absentees when the men go out to work by themselves, leaving their wives and children behind in the village. Six such split families existed in Sivepe; in every case, regular envelopes containing money were posted to the wife. In the cases I investigated, eight to ten envelopes arrived in a year, each containing $10 and sometimes $20. These envelopes represent a considerable percentage of village income. As long as the money keeps coming, a man knows that his relations will closely watch his wife and will carry out obligations towards his affines; thus, his wife will be kept under strong moral constraint from all sides. It would be cynical to explain the generosity with which men maintain their wives wholly by such motives, but the Orokaiva do regard "looking after" the wives of absentees as a valuable service and the envelopes are thus a form of repayment. "Looking after" the wife and children, indeed, comprises a wide range of services which must be performed by men of the lineage and which are a reasonable charge against the income of a wage earner. As most places of employment in Papua-New Guinea do not provide for married accommodation, we may regard villagers and migrants as engaged in a joint economic enterprise in which each group performs services and obtains benefits.

At the time of the eruption several Sivepe men were working on plantations; today, Sivepe people are interested only in the better-paid town jobs, mostly in Port Moresby. In Inonda, however, two men often take up short spells of plantation work while a third, trained as a driver by an anthropologist, has a regular government job in Popondetta.

22: Schwimmer E-4,5 (1966-1967) 1969 QJ23 Orokaiva QJ23 Mount Lamington

TABLE 7

FOOD PLANTS PER HOUSEHOLD:
INONDA AND SIVEPE COMPARED

Sources: Crocombe and Hogbin, 1963: 8; Rimoldi, 1966: 17

Crop	Inonda		Sivepe	
	Average	Range	Average	Range
Taro (Colocasia sp.)	1.3 acs.	2.6 - 0.4 acs.	0.97 acs.	0.39 - 2.30 acs.
Sweet Potato	0.2 acs.	0.4 - 0 acs.	0.07 acs.	0 - 0.20 acs.
Corn	72 plants	140 - 0 plants	223 plants	0 - 442 plants
Bananas	81 trees	145 - 12 trees	71 trees	35 - 126 trees
Pitpit (ins)	56 clumps	181 - 4 clumps	88 clumps	0 - 400 clumps
Sugar	71 clumps	167 - 34 clumps	34 stools	11-54 stools
Yams	24 vines	61 - 0 vines	65 vines	0 - 136 vines
Manioc	10 plants	27 - 4 plants	a few	
Taro (Xantosoma sp.)	5 plants	25 - 0 plants	28 plants	0 - 91 plants
Native Cabbage	---	---	22 plants	0 - 100 plants
Pawpaw	---	---	17 trees	5 - 32 trees
Beans	a few		17 plants	0 - 110 plants
Cucurbits	2 vines	10 - 0 vines	13 vines	9 - 28 vines
Saallots	a few		a few	
Ginger	---	---	a few	
Tobacco	---	---	18 plants	0 - 59 plants
Pineapples	1 plant	7 - 0 plants	no data	
Tomatoes	a few	---	no data	

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mingled more freely as a result of travel on the government roads and trails (which they have to keep in order), trading. Mission and official gatherings, and other new opportunities for interpersonal relations. One special feature of Orokaiva life in modern times is the annual burning-off of grasslands by hunting parties in order to get wild game. This has probably involved the assembly of larger groups and is one of the few activities which could induce intersettlement cooperation. The writer sensed the parallel of the crude local fires set for garden clearing and the general burning-off of grasslands to the major burning and blackening in the wake of the volcano—doubtless a mighty job of clearing to the Orokaiva eye.

Within the limits that brief characterizations of personality norms can be valid, observers seem to agree that the Orokaiva as individuals have traits congruent with the social structure that favor individuality and mobility. Even the casual visitor gets a sense of independence, alertness, self-reliance, "strong talking," dignity, restraint, imperturbability at meeting the unexpected event, and high-tension interpersonal behavior in general. This is in particularly striking contrast to such an elaborately structured society as that of Samoa, where the writer had been working shortly before. In informal groups seen around the camps and waiting at airfields for transport, women and children, far from being in the background, kept up a busy verbal exchange with the men. The Administration has considered the Orokaiva territory as perhaps the best recruiting ground for its Royal Papuan Constabulary on the basis of these personality characteristics, including ability to meet crisis conditions such as patrols may encounter.

The Orokaiva religious history is also particularly interesting here. Their traditional faith, Williams says, though in many respects vague and locally variable, concerned itself "primarily with the spirits of the dead" and their influence on the welfare of the living. Death was appraised with particular realism, although it was considered ultimately as the result of supernatural causes. Magic had a consistent place. Orokaiva country, however, has been swept in modern times by a series of new cults indicative of religious adaptability in the face of fresh experience. First to come into prominence was the *Baigona*, or "snake cult" of 1911-12, succeeded from 1914 on by the so-called "Taro cult" which in turn had undergone a series of local reformulations by the time Williams reported on it in 1924.[7] Central features of the Taro cult were association of successful taro cultivation with the ancestral spirits, approached by way of a "shaking-fit" technique of revelation, together with somewhat new types of public ritual and symbols, including fragmentary elements from Christianity. Later Belshaw and others reported that "Christian Co-operative Evangelist" societies, which were developed by the Anglican Mission among some Orokaiva converts for the cooperative growing of rice and other crops, tended to assume a somewhat parallel and absorbing mystical agriculture context. Rumors spread of "an order from the King (of England) that co-operatives

7. *Orokaiva Magic*, Part I; see also Chinnery, E. W. P. and Haddon, A. C., "Five New Religious Cults in British New Guinea," *Hibbert Journal*, 15, 3 pp. 448-463 (1917). Materials are also found in the official reports of the time.

to get out from under the direct control of Government and that everything was "subordinated to this end." Those who had title to land outside the closed area and wished to get to it, readily agreed to official plans for resettlement, including the village building program. Those whose land was inaccessible—too far off the road or in the danger area—attempted to obtain permission to occupy land of kinsmen or others who might be willing. The most immediate objective was to break in gardens and to reduce or eliminate the need for rations, emergency wild foods, or daily treks into the closed area for salvage produce. Here difficult problems are foreshadowed. This pattern of settlement will be possible only on a short term basis. For longer occupation the people will either have to scatter out in widening areas to make their further seasonal shifting gardens, or else make the radical change to sedentary gardening which has no appeal to most of them.

The situation is made more serious by the fact that the safe land tracts are, in general, less fertile than the devastated higher slopes; these and comparable areas elsewhere do not carry such relatively dense settlement.[9] Mr. H. T. Plant, an officer with anthropological training, made a quick survey of land tenure and social structure in the resettlement zone on the Wairopi side. On this basis he estimated that with only about five acres at hand per person, or approximately 100 people to the square mile, the available land is inadequate by New Guinea standards to support the population. In April, Belshaw found that great uncertainty surrounded land use problems. There were frequent moves, uncertain titles, disputes over tenure, and conflicting authority among the hamlet and clan leaders. He predicted that it might take months to sort out the economic and social threads involved. It will take far longer to build up seed stock, domestic animal herds, and other bases for normal living, as well as the large quantities of food required for the proper ceremonies for the dead which will eventually be held. In due course other settlement areas than those immediately occupied will need to be found for people still in the camps.

Government and Mission personnel were ready to offer judgements on Orokaiva behavior in the crisis situation, and camp records had some objective data to the extent that people broke the law, entered hospital with wounds, or otherwise came under official purview. In addition to the "sense of guilt" already mentioned, there was said to be considerable "anxiety," "irritability," "excitability," and "quarreling." The legal record shows several sharp clashes where injuries were inflicted, wife-beatings, and other kinds of quick tempered violence. Under extreme provocation, it was said that they might "throw hysterical fits." An obvious source of early tension came from not knowing the fate of missing clansmen. Officials denied knowledge of any significant mental derangements beyond the scattering of instances known previously.

The Oro Bay camp inhabitants appeared to be under by far the most stress and strain. Here, out of sight of the

9. Williams, after referring to the rich Lamington slopes, says: "A somewhat discouraging contrast is found in the forests of the plain proper, which are sometimes gloomy and waterlogged . . . and of wholly inferior quality" (*Orokaiva Society*, p. 12).